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Trade Cost, Trade Policy and Trade Volume: A Study of Indian Apple Market

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Abstract

Trade Cost form a significant part of moving goods from producer to consumer. These cost are particularly high in developing countries. As a representative country, we look at India's apple trade. Although tariff on apple imports is high, local distribution cost are much higher. While Tariff reduction will somewhat benefit the consumer, liberalization that promotes lowering of traders' margins may facilitate high-volume, low-margin trade. Trade cost may come down if uncertainty regarding phytosanitary norms goes down and infrastructure investments in cold chain and retails chains pick up. C*eteris paribus*, it is expected that demand for imported apples could reach 70,000 tonnes per year in a decade.

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1. Introduction

Liberal trade policies have had to evolve over many decades now. After the bitter experience of the two World Wars, an effort was made to form an International Trade Organization (ITO) with a mission to reduce trade barriers among countries. The effort turned out to be abortive; however, a General Agreement on Tariff and Trade (GATT) was reached by twenty-three member countries in 1948. The membership and scope of GATT expanded over time, and in 1995, it took form of World Trade Organization (WTO). Through WTO, impetus was also given to liberalization in agricultural trade. Concurrently with these developments, significant technological improvements occurred in the means of transport, communication, and business services, which facilitated global trade and finance. As a result, it became fashionable to say that the world was becoming a global village and that countries were increasingly coming closer to each other.

In a recent paper, however, Anderson and Wincoop (2004) argue, and we quote, "the death of distance is exaggerated." They argue that trade costs are large, even aside from the ones arising out of trade policy barriers. Trade cost can be defined as cost incurred in moving a good to the final consumer other than marginal cost of producing the good. This includes transportation cost such as freight and travel time cost, cost due to policy barriers such as tariff and non-tariff barriers, and other costs associated with economic environment – local distribution cost, mark-up attributable to oligopolistic distribution chains, lack of infrastructural investments etc.

Anderson and Wincoop observe that direct policy instruments such as tariffs and quotas are less important now compared to environmental barriers such as lack of infrastructure investments, informational institutions, law enforcement, and local distribution costs. Their estimates for a representative industrialised country indicate that trade policy related cost account for only about 8 percent of the border price and local distribution cost account for 80 percent of the border price. In terms of consumer price, these percentage turn out to be 4 percent and 36 percent respectively. Frequently, reliable micro data on trade cost items is difficult to get. Therefore, trade literature uses nominal protection coefficient (NPC) to indicate trade barriers. NPC represents the ratio of domestic price and border price of an importable. Using this ratio, Deardorff and Stern (1998) show that the overall barriers are generally higher for agricultural sector. For example, in the case of US, domestic sugar support prices and import quota reflect a tariff equivalent in excess of 100 percent, net of customs duty. Similarly, for condensed milk and cream the tariff equivalent amounts to 60 percent, net of customs duty.

Given the definition of trade cost and some benchmarks on the proportion of different items within it, it is of great interest to know what are the important trade cost and their magnitudes for developing countries. This assumes importance as many developing countries are embarking on trade liberalization in response to the signing of WTO agreements. The effect of a particular measure of trade liberalization will depend on which trade cost get reduced and to what extent. The reduction of trade cost is expected to result in lower prices for consumers, increased trade volumes, and displacement of domestic production. In this context, we focus on the Indian apple market, as an example of what developing countries with growing incomes and populations might face as they liberalize their markets for food products.

2. Indian Apple Marke

In the 1990's the Indian economy entered a state of transition when the central government began giving-up its protectionist trade policies. Reforms in the traded sector gathered

momentum especially during the post-Uruguay Round period. The first major step towards liberalization occurred in 1997 when the government lifted import licensing restrictions on several food items by moving them into Open General License (OGL) list. By 1999, around 470 agricultural products were put on OGL, and, today, restrictions on almost all of the agricultural products, once exceeding more than 1400 in number, have been eliminated. In fact, while the bound duty rates submitted to the WTO are still quite high, the actual duty rates have come down quite significantly, with a few exceptions. For example, on horticultural products such as grapefruit and kiwi, the rates have been lowered to 25 percent and 30 percent respectively. The apple duty rate has been established at 50 percent.

Almost coinciding with the liberalization under the Uruguay Round, the Indian economy has grown rapidly. From 1994-1995 to 1999-2000 the average annual GDP growth rate has been 6.7 percent. In the recent past, i.e., 2003-2004, the GDP growth rate reached a record high of 8.22 percent. As a result of this, increased incomes have contributed to the burgeoning middle and higher-middle class. The middle class in India accounts for more than 250 million customers, where 60 million live in the eight largest cities (Goldammer 2001). This population is expressing preferences for eating healthy and nutritious food that includes fruit such as apple. Moreover, with higher GDP growth rates, a segment of this population is maturing into higher middle class category which has the economic means and interest in purchasing higher value foods including imported apples.

On the supply side, India has produced apples for many years but per capita availability has not increased much. It was about 1.2 kilograms (kg) per person per annum in early 1980s and has increased modestly to 1.35 kg per person per annum at the turn of the century. Apple yield in India, about 6 tonnes per hectare, is one of the lowest. Barring China, apple yield in most other leading apple growing countries is 25 tonnes per hectare or higher. Low yield in India is a reflection of apple crop being taken on mountainous terrain, exposed to vagaries of monsoon, and dependent on almost a century-old cultivars of the Delicious variety. After the quantitative restrictions on imports were removed, apple supplies did start coming in from other countries, although in moderate amounts. In 2003, about 22 thousand tonnes of apples were imported in India. With domestic production hovering around 1.4 million tonnes, this amounts to less than 2 percent of domestic production. Now, concerns are expressed by interest groups in India, and by some researchers, that Indian markets could be flooded with such agricultural imports following further import liberalization. The potential rise in trade volumes will depend on demand elasticities and the extent of reduction in consumer price. Moreover, reduction in consumer price will depend on the extent of reduction in the trade cost.

3. Tariff and Non-tariff Cost

Import Tariff

At the time when quantitative restrictions were removed, an aggregate *ad valorem* tariff of 45.6 percent was in place on apples. However, since then, the import duty on apples has been increased to 50 percent. Generally, surcharges and additional duties are also levied on the basic customs duty. However, these are not applied to apples as the customs duty is already at the bound level. Tables 1 shows that customs duty on apples is high compared to the duty on other fresh fruit. For example, the duty is lowest on plums and grapefruit. Among other fresh fruit, all carry a duty of 35 percent or less. India's customs duty on apples is high not only in comparison to the duty on imports of other fresh fruit, but it is high compared to import duties on apples across many developing and developed countries. Table 2 illustrates this point. Except for Turkey, which has an import duty of 60.3 percent, almost all countries have import duties much lower than that of India's or have no import duty at all.

Table 1: India's Customs Duties on Select Fresh Fruit*

Fruit	Rate	Fruit	Rate
Apples	50%	Papaya	30%
Banana	30%	Pears	35%
Grape Fruit	25%	Plums	25%
Guavas	30%	Kiwi Fruit	30%
Mandarins	30%	Strawberries	30%
Mangoes	30%	Water Melon	30%

Source: CBEC. * Rate of duty is lower by 10 percent for preferential areas.

Table 2: Customs Duties on Apple

Country	Rate	Country	Rate
Bangladesh	37.5%	Korea	45%
Canada	0%	Malaysia	5%
Chile	0%	Mexico	0%
China	10%	New Zealand	0%
Dominican Republic	20%	Saudi Arabia	0%
European Union	9%	Singapore	0%
Egypt	40%	Turkey	60.3%
Hong Kong	0%	United States	0%
India	50%	United Arab Emirates	0%
Japan	17%	Vietnam	40%

Source: Northwest Horticulture Council (NHC).

Non-Tariff Measures

Initially, when apples were imported from United States in the late 1990s, the shipments had to accompany USDA Animal and Plant Health Inspection Service (APHIS) certificate. However, there have been some recent changes. The Government of India promulgated the Plant Quarantine (Regulation of Import into India) Order in 2003, and from January 1, 2004 began enforcing this order. The order establishes import procedures and quarantine requirements both for planting and consumption of agricultural products. Schedule VI gives detailed list of plant and plant materials permitted for imports with additional declarations (AD) and special conditions. Along with the phytosanitary certificate, now importers are expected to give an AD either stating that the fruit is free from pests such as Mediterranean fruit fly, light brown apple moth, fireblight, scarlet mealy bug, and apple maggot, or stating that the specified pests do not occur in the country or state of origin. Though these requirements are in place now, as long as the criteria are met and reputation of imported apples is established, the norms may not become a non-tariff barrier. In fact, in contrast, some countries such as Australia, Chile, and Korea do not allow import of apples at all. Other countries, such as China and Japan have restrictive phytosanitary protocols (Krissoff, Calvin, Gray, 1997).

Similarly, imported apples have to follow national standards on pesticide residues under the Prevention of Food Adulteration Act (PFA). In Table 3 we provide a sample comparative listing of maximum residue levels (MRLs) allowed in United States, India, the European Union and Codex. Whenever a standard for a particular pesticide residue does not exist, India follows the Codex standard. For example, for Ethephon, no MRL is available for India, and India would follow the Codex norm. While the European Union standards seem to be stricter in general for some of the residues, Indian standards are also stricter than in the United States. For example, for

Captan, Malathian and Benomyl, Indian MRLs are lower than that of United States. Such divergences could be a potential trade barrier.

A related quality norm that could have been an impediment for imports was the requirement of apple waxing. In August 2003, Department of Health issued a draft notification indicating that fresh fruit should be free of wax coating, mineral oils and added colouring. Exporting countries as well as import traders in India were surprised by this development. In fact, even the Himachal Pradesh Horticultural Produce Marketing and Processing Corporation (HPMC), a parastatal entity engaged in marketing of Himachal apples has apple waxing facilities. Some additional confusion was generated due to rumours concerning Indian preferences to consume apples that are not treated with animal based waxes. Later it was confirmed that the official notification was for the application of non-food-grade waxes in domestic fresh fruit and vegetables. This had nothing to do with waxing of imported apples as such or the issue of animal based waxes. In fact, the draft order had never been implemented. While tariff cost are quite transparent, it is difficult to measure the cost of non-tariff barriers, especially the one's arising out of uncertainty associated with framing and implementation of phytosanitary norms. Cost of such uncertainties may get (p)added up in traders' margins in the local distribution cost.

Table 3: Maximum Residue Levels (MRL) of Apples (parts per million)

	US	Codex	EU	India
Ethephon	5.0	5.0	3.0	NA
Benomyl	7.0	5.0	2.0	5.0
Endosulfan	2.0	1.0	0.3	2.0
Dodine	5.0	5.0	-	5.0
Malathian	8.0	2.0	-	4.0
Captan	25.0	25.0	-	15.0

Source: Ministry of Health and Family Welfare (MHFW); Northwest Horticulture Council (NHC); FAOSTAT;

4. Local Distribution Cost

Imported Apples

For understanding the local distribution cost for imported apples, we considered U.S. apples sold in Delhi. In May 2003, we had observed Washington Red apples sold in Delhi for Rs. 100 per kilogram. This translates into a price of Rs. 2000 per 20 kilogram box. During the same month, the c.i.f. import unit value of U.S. apples was Rs. 25.49 per kilogram in Mumbai port. This translates into a price of Rs. 509.80 per 20 kilogram box. Based on our conversations with industry experts, we learned that transportation cost between Mumbai and Delhi by a 10 tonne refrigerated container is about Rs. 35,000. We also learned that the imported apples are taken to the wholesale market in Delhi where a commission of 8 percent and other market fees are paid. Other costs incurred include clearing at port, carriage and handling charges (about 4 percent). Based on the information gathered through market visits and anecdotal information, importer and wholesaler margins were assigned at 17.5 percent of their cost. Sub-wholesaler and retailer margins were assigned at 15 and 30 percent of their cost. These margins, when added to various cost and prices in the supply chain, tally with the observed retail price in Delhi (Table 4).

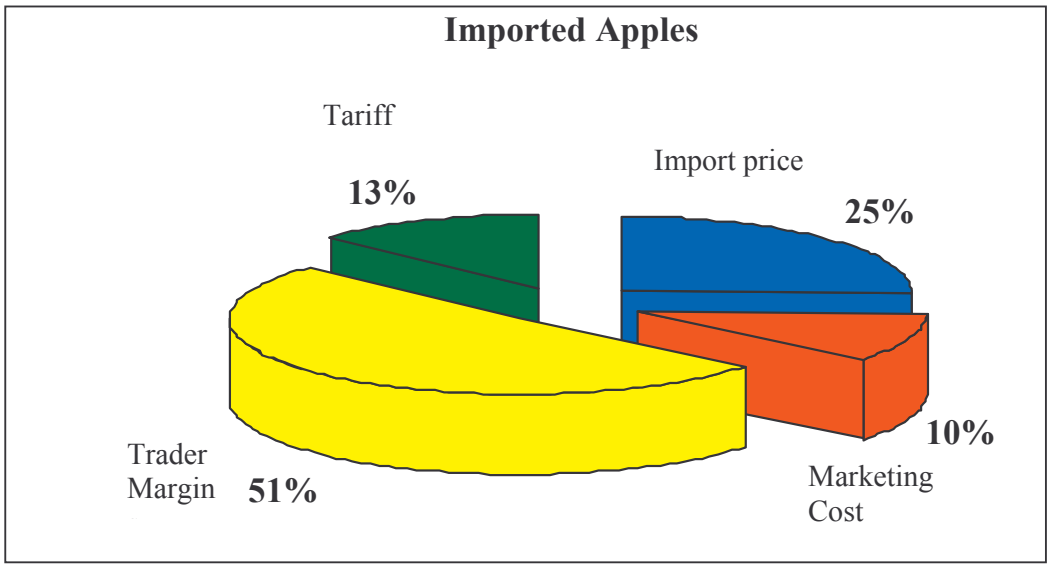
Table 4: Marketing Cost and Margins for Imported Apples, May 2003

Description	Rs. Per Box of 20 Kg.	
Import Unit price, CIF*		**509.80**
Expenses incurred by importer on:		434.00
Tariff	254.90	
Clearing	20.39	
Freight	70.00	
Commission of agent	88.71	
Importer's margin***		165.17
Realisation at wholesale market		1108.97
Expenses of trader		22.59
Carriage/Handling	1.50	
Cold Storage (15 days on an average)	10.00	
Market fee/commission	11.09	
Wholesale trader's margin***		198.02
Sub-wholesaler's purchase price		1329.58
Sub-wholesaler's margin***		199.44
Retailer's purchase price		1529.02
Retailer's expenses		5.00
Carriage/Handling charges	5.00	
Retail margin***		465.98
Consumer price**		**2000.00**

* Sourced from DGCIS. ** Observed market price of US apples in Delhi, May 2003, *** Calculations based on field visit information, import unit values, and retail prices.

Of the consumer rupee spent on U.S. apples in Delhi, the total trader margin in the supply chain amounts to about 51 percent. This includes an 8 percent share for the importer. Retailer share is about 23 percent and marketing margins of taking produce from Delhi wholesale market and selling it to the retailer is about 20 percent. The 50 percent customs duty on imports amounts to only 13 percent in the final consumer rupee (Figure 1). Whatever value addition is done to the apples in terms of waxing, grading, better packaging, traceability (& ocean shipping) is already included in the import unit values. What occurs in India is simply transportation and distribution of apples. In this context, with limited value added, a traders' margin of about 51 percent seems generous and may reflect imperfections in the market. In fact, while the 13 percent tariff share reflects a customs duty of 50 percent, the 51 percent traders' margin in consumer rupee represents a tariff equivalent of about 200 percent on c.i.f import unit value.

Figure 1: Share in Consumer Rupee, Imported Apples



Domestic Apples

We wondered whether or not the same kind of distribution cost exist for the domestic apples a well. To assess the prevailing local distribution cost, we focused our attention on Himachal apples being sold in the Delhi market. We examine the harvesting season 2003 (November) for which retail price and wholesale price in Delhi were available. The retail price of Indian apples in the month of November 2003 was Rs. 45 per kilogram in Delhi, which translates to Rs. 900 per 20 kilogram box. For the same month, the average wholesale price in the Delhi wholesale market was Rs. 2066.67 per quintal, which translates into Rs. 413.33 per 20 kilogram box. The marketing cost, prices and margins at different stages of the supply chain are presented in Table 5. Given the wholesale price, we worked backwards by subtracting various costs incurred by the grower on commission, transportation, packaging etc. and arrived at the net price received by grower, which amounts to Rs. 295.27. Similarly, we worked forward to add various costs incurred by agents down the supply chain. The only unknowns that needed to be filled in were the marketing margins. Based on the information gathered through market visits and anecdotal information, wholesaler and sub-wholesaler margins were assigned at 20 percent of their cost, and retailer margin was assigned at 34.5 percent of his/her cost. These margins, when added to the various cost and prices in the supply chain, tally with the observed retail price in the market.

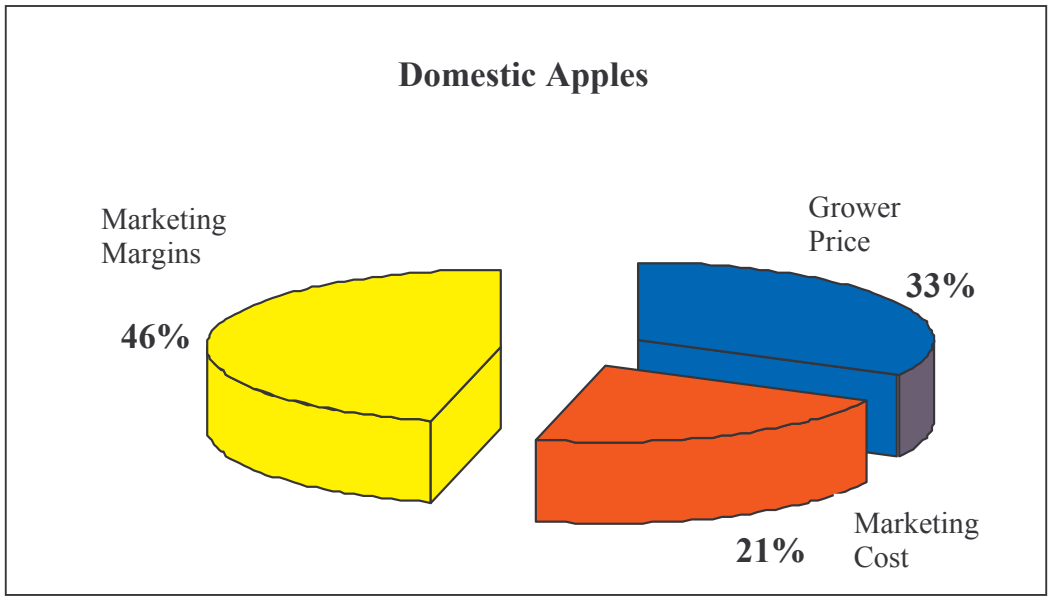
Table 5: Marketing Cost and Margins for Domestic Apples, November 2003

Description	Rs. Per Box of 20 Kg.	
Net price received by grower		295.27
Expenses incurred by growers on:		118.07
Picking, grading and packing	12.00	
Packing materials	45.00	
Carriage up to road head	3.00	
Freight up to market	20.00	
Commission of forwarding agent	2.00	
Loading/Unloading charges	3.00	
Commission of commission agent	33.07	
Realisation at wholesale market*		**413.33**
Expenses of wholesale trader		5.63
Carriage & handling	1.50	
Market fee	4.13	
Wholesale trader's margin***		83.79
Sub-wholesaler purchase price		502.76
Sub-wholesaler margin***		100.55
Retailer's purchase price		603.31
Retailer's expenses		65.33
Carriage and handling charges	5.00	
Produce wastage	60.33	
Retailer's Margin***		231.36
Consumer Price**		**900.00**

* Sourced from Horticulture Information Service, NHB. ** Observed market price in Delhi, November 2003, *** Calculations based on available wholesale and retail prices, market visit and anecdotal information.

Figure 2 shows the break-up of various costs and margins in the consumer rupee spent on domestic apples. Wholesale and retail margins of traders account for 46 percent of the consumer rupee. Grower share is at 33 percent. This number appears higher compared to the grower share in the United States for Red Delicious apples which seems to have fluctuated between 20 to 25 percent (Belrose Inc., 2003). However, this may not be surprising as lot of value addition occurs in the U.S. supply chain in terms of grading and packing, introducing traceability marks (price look-up stickers), refrigerated transport, consumer friendly retail display and retail packing. These types of value additions do not take place in India; instead produce mostly gets divided into smaller lots until it is sold lose at the retail level.

Figure 2: Share in Consumer Rupee, Domestic Apples



A comparison of distribution cost for domestic and imported apples clearly shows that both in relative and in absolute terms, margins of traders are very high for imported apples. We understand that currently, only a limited number of importers have been operating in this trade. Mumbai and Delhi markets have about five big importers and Chennai three. Importers claim that the existing cold storages and refrigerated containers are quite limited in number, quality and capacity. Moreover, retailing of imported apples leaves a lot to be desired, with street vendors selling the majority of the fruit. To work on large volume, low mark-up model, spread of modern retail chain-stores and their cool chain linkage with importers is necessary. In addition, there might be some uncertainties associated with phytosanitary clearances mentioned earlier on. Thus, costs arising out of uncertainties of inadequate infrastructural investments, oligopolistic nature of trading business, and the non-tariff phytosanitary uncertainties might be contributing to high trading cost of imported apples.

That the trade cost, especially within India, are high for imported apples compared to domestic apples does not come as a complete surprise. Whenever trade cost are unobservable, researchers have used gravity models to link trade flows to observable variables and unobservable trade cost. The estimated gravity equations take the form:

$$X_{ij} = a_1 Y_i + a_2 Y_j + B \ln (Z_{ij}) + e_{ij,}$$

where X_{ij} is the log of exports from i to j, Yi and Yj are log GDPs of the exporter and importer, and Z_{ij} is a vector of observable variables to which bilateral trade barriers are related. McCallum (1995) applied this model to US-Canada trade with US states and Canadian provinces as exporter and importer entities. He utilized two observable variables for the vector Z_{ij}, namely distance between states and provinces and a dummy for the country to which the states and provinces belonged. Controlling for distance and size, he showed that the US-Canada border had a big impact on trade. Such impact is attributable to trading cost arising out of different customs, language, infrastructural investments, enforcement mechanisms, and lack of information. Our estimates of higher trading cost for imported apples corroborate McCallums's inference based on trade flows.

5. Price Comparisons

Yet another indirect way of inferring about trading cost is to calculate nominal protection coefficient (NPC). The level of protection offered to any domestic product *vis-à-vis* an imported product can be measured by calculating NPC. NPC, defined as (P_d / P_b) is the ratio of domestic price P_d to its border price P_b. While the domestic price is measured in local currency at the wholesale market, border price is the CIF world price at the same market location exclusive of customs duty but adjusted for expenses to bring the product to the wholesale market. In the absence of market distortions, tariff and not-tariff barriers, and quality differences, border price and domestic price should be exactly same, and, hence the NPC would equal to 1. The higher the NPC, higher the protection offered to domestic product. For example, if there were no distortions or market imperfections except a customs duty of say 10%, the NPC would be 1.1, indicating that domestic suppliers get a protection of 10 percent. This implies that with customs duty in place, domestic suppliers can afford to raise the price by 10 percent over the international price.

We calculated the NPC for September, 2003. September is the peak harvesting month for domestic apples. The average import unit value for all exporting countries in September 2003 was Rs. 30.3. Adding all expenses to bring the apples from Mumbai port to the wholesale market place, the effective price became Rs. 39.34 per kilogram. The wholesale price in Mumbai for September 2003 was Rs. 29.21 per kilogram. The NPC for this month turned out to be -

$$NPC_{Sept,\ 03} = \frac{29.21}{39.34} = 0.74$$

This implies that domestic suppliers are not getting any protection at all. In fact, the NPC is much lower than 1. This is a surprising result since there is a 50 percent customs duty on imported apples, and as we have described earlier, there are significant local trade costs in importing apples. The nominal protection coefficient should have been 1.5 or more.

During the Indian harvest season, domestic apple prices are depressed. Hence, for a better comparison, we considered the mean wholesale price of domestic apples averaged over an entire year. The average wholesale price in Mumbai market for the year 2003 was Rs. 34.97. Similarly, the average import unit value of apples exported to India in 2003 was Rs. 29.10 per kilogram. Adding the clearance expenses, commission at the wholesale market, and importer margin totalling to about Rs. 8.57 per kilogram, the effective border price at the same wholesale location in Mumbai was Rs. 37.67. Therefore, NPC for the year 2003 turned out to be:

$$NPC_{03} = \frac{34.97}{37.69} = 0.93$$

Even after considering yearly average prices, result shows that no protection is offered to domestic apple suppliers despite a customs duty of 50 percent and other high trade cost.

This peculiar result points to the fact that imported apple and domestic apple are not (close) substitutes. One explanation for the above results is differences in quality between domestic and imported apples. In our visits to retail outlets we observed that imported apples relative to domestic apples have very low latent damage to the fruit, they are uniform in terms of size, shape, colour, and look better aesthetically due to waxing and/or better packaging. Imported apples are certainly competitive in terms of quality and availability, and this might explain why they receive a premium relative to domestic apples. In terms of taste as well, it is only during the Indian harvesting season from late August to November that fresh, crisp and juicy Indian apples are available. Thus, the two markets appear to be quite separate. Imported better quality apples are sought after by the higher middle class and rich Indians, while domestic apples are bought by the other sections of the society. This has implications for the impact of trade liberalization policy - the extent of increase in trade volumes and displacement of domestic production.

6. Trade Policy and Import Volume

At this stage, we are in a position to assess the impact of a liberalized trade policy on apple imports. We know that latest domestic consumption and imports of apple are about 1.42 million tonnes and 22,000 tonnes respectively. As indicated earlier, we consider markets for imported apple and domestic apples as separate. Therefore, we consider different estimates for demand elasticities for imported and domestic apples. Devadoss and Wahl (2004) estimate the wholesale price elasticity of domestic apples to be -0.53. Imported apples at this time are a luxury good, and their price elasticity must be very high. In fat, it is well understood that on a linear demand curve, higher the price, higher is the price elasticity of demand. We also expect retail price elasticity to be higher than the wholesale price elasticity. Therefore, we assume price elasticity of imported apples to be -1.0. Moreover, Devadoss and Wahl have estimated the income elasticity of domestic apples to be 1.05. However, for imported apples it must be very high as these apples are expensive and considered to be luxury good at this time. We assume income elasticity for imported apples to be 1.5. Also, we know that GDP growth rate has been 8 percent in the recent past. Assuming a conservative growth rate of about 6 percent for a decade, we derive the import prospects under alternative tariff and margin reduction scenarios.

As Table 6 shows, in the status quo situation, i.e. no change in the current level of tariff and traders' margin, the import demand will rise to about 52,000 tonnes per year in a decade. It is highly unlikely that tariffs will come down to zero in any foreseeable future. If the tariffs come down to about 25 percent, then the import demand will rise to only about 55,000 tonnes in a decade. This result is not surprising, as we know that tariff constitutes only 13 percent of the retail price of imported apples. We also know that traders' margin constitutes 51 percent of the retail price of imported apples. Hence, significant reduction in the margins should cause significant decline in price, and hence significant increase in demand for imported apples. Over time, with increased competition among traders and investments in local cold chain, margins on imported apples could come down. If the absolute level of margins comes down to the level of margins for domestic apples, it amounts to reducing margins to 21 percent. This is the scenario 3 below. In such a case, imports will rise to 66, 417 tonnes per year in a decade. Finally, if both the tariff level is brought down to 25 percent and traders' margins come down to 21 percent, we expect demand for imported apples to reach a level close to 70,000 tonnes a year in a decade.

Table 6: Apple Import Scenarios (tonnes).

Scenario	Import Tariff	Traders' Margins	Imports by 10^{th} Year	Cumulative Imports
1. Status Quo	50%	51%	52,082	364,327
2. Tariff Reduction	25%	51%	55,130	385,651
3. Margin Reduction	50%	21%	66,417	464,600
4. Scenario 2 & 3	25%	21%	69,465	485,925

Note: Base year 2003, base year imports 22,000 tonnes, price elasticity of demand -1.0, and income elasticity of demand, 1.5.

It must be borne in mind that it has been only about 5 years since imported apples have arrived in India. The market is new and developing. Apples are on the Open General Licence (OGL) list which now makes it easier to import them. Although a regulatory plant quarantine order is in place now, it has not led to any non-tariff barrier to trade. We understand that importers such as Garden Fresh, Yuppa, and Eurofruit are investing in infrastructure for cold storage and transport. Moreover, Indian chainstores such as Food World, Big Bazaar, and Food Bazaar are expanding their operations quite rapidly and are providing separate shelf space for fruits. Only recently, Shoprite, a multinational food wholesaler/retailer opened India's largest

supermarket in Mumbai. With such developments, overtime, one would expect to see new entrants into apple import business and it might lead to fall in import margins which are quite high at this time. If price of imported apples is any indication of this trend, we learn that Shoprite is selling imported apples at Rs 70/kg in Mumbai at this time.

7. Concluding Comments

All costs in excess of marginal production cost can be considered as trade cost. These cost include costs incurred on ocean shipping, tariff and non-tariff barriers, local distribution, and, other costs such as arising out of uncertainties of inadequate infrastructural investments. Among these, ocean shipping cost, are fairly stable, and do not get affected by trade liberalization policies. Trade literature shows that trade cost are large for industrial countries, and even larger for developing countries. As a case study of a representative developing country, we looked closely at the trade cost for the Indian apple market. Although customs duty of 50 percent on apple imports is quite high, the local distribution cost is much higher. This is on account of high traders' margins which account for 200 percent of the c.i.f. import unit value of apples. In terms of share in the consumer rupee spent, customs duty accounts only for 13 percent and traders' margins account for 51 percent. Moreover, the NPC coefficient corroborates our field experience that there are two separate markets – one for the domestic apples, and one for imported ones.

Sooner or later, as a part of the WTO led liberalization process, countries will have to lower their tariff levels. Developing countries like India will have to lower their high tariffs such as the ones on apples. Since tariff account for only 13 percent in the final consumer rupee, and, since India is not likely to eliminate tariff on apples altogether, the reduction in tariff is not going to cause substantive reduction in price of apples. Therefore, this need not cause substantive increase in imports of apples. In fact, since market for imported apples is different than market for domestic apple, tariff reduction will not injure the domestic suppliers. It only will benefit consumers in terms of somewhat reduced price and increased availability.

The real gains to consumers could come from reduction in local distribution cost, mainly the traders' margins. Margins are high probably because at this time there are some uncertainties regarding the phytosanitary norms, investor uncertainty about investing in cold-chain infrastructure, and restrictions on foreign direct investments in retail chains. These reasons also lead to only a few traders operating in the import business. Trade cost would come down significantly as the recently set phytosanitary norms get established in a consistent manner and investments in cool chain infrastructure materialize. As mentioned in the earlier section, a movement in that direction is already happening.

References

Anderson, J. and E. Wincoop (2004). "Trade Cost," *J. of Econ. Lit.*, Vol. XLII, September, pp. 691-751.

Belrose Inc. (2003). "World Apple Review." Pullman, WA, USA.

CBEC. Central Board of Excise & Customs, www.cbec.gov.in/cae/customs/cs-tariff/

Deardorff, A. and R. Stern (1998). *Measurement of Nontariff Barriers*, Ann Arbor: U. Michigan Press.

DGCIS (1998-2001). "Monthly Statistics of Foreign Trade of India." Directorate of Commercial Intelligence and Statistics, Kolkata.

Devadoss S. and T. Wahl (2004). "Welfare impacts of Indian apple trade policies", Applied Economics 2004. Volume 36 Number 12.

FAOSTAT. http://faostat.org/faostat/collections?subset=FwdQuality

Goldammer, T. (2001), "A Passage to the Indian Market could Start With Horticultural Products," Horticultural and Tropical Products Division, FAS/USDA, Washington, DC.

Krissoff, B., L. Calvin, and D. Gray (1997). "Barriers to Trade in Global Apple Markets," Fruit and Tree Nut Situation and Outlook, FTS-280, August.

McCullum, J. (1995). "National Borders Matter: Canada-US Regional Trade Patterns," *Amer. Econ. Rev.*, Vol 85, No.3, pp. 615-23.

MHFW. Ministry of Health and Family Welfare, http://mohfw.nic.in/pfarules.pdf.

NHB (2000–2003). "Horticulture Information Service (Monthly)." National Horticulture Board, Ministry of Agriculture, Government of India.

NHC. Northwest Horticulture Council, http://nwhort.org/tariffratebarr.html.

NHC. Northwest Horticulture Council, http://nwhort.org/codex-US.html.